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produces it, but is very toxic to plants belonging to a species in which the glucoside is not naturally found. The toxic glucoside, when added to Knop's culture medium in which the plants are grown, produces very marked abnormal changes in the morphology of the roots, resulting also in a very stunted growth of tops. It appears that we have here another group of substances, the individuals of which possess a constitution sufficiently characteristic of the species in which they are found that when they are applied to individuals belonging to nonrelated species they produce abnormal responses. The author has not yet found that glucosides will furnish carbohydrate food for plants when they are grown in a carbon dioxide free atmosphere, as has frequently been found to be the case with glucose.

Those wishing to germinate seeds and grow seedlings under aseptic conditions will be interested in the detailed descriptions of the apparatus and procedures employed in growing his plants. An excellent review of the mass of literature on the subject and a survey of glucosides in plants will be found in the earlier papers of this series.—CHARLES O. APPLEMAN.

Physiology of fungi.—DUGGAR, SEVERY, and SCHMITZ¹⁶ have undertaken a study of the comparative nutrient value of some of the decoctions ordinarily used in the preparation of culture media for fungi. The decoctions which were prepared on the basis of 50 gm. of dry matter to a liter of water were made from bean, sugar beet, prune, potato, turnip, cornmeal, apple, mangold, celery, carrot, and salmon. The standard decoctions were employed alone and in combination with sugar and various mineral nutrients. It was found that in their nutrient value the decoctions are very dissimilar for different fungi. The addition of sugar in most cases increases the yield, but the addition of sugar with nitrate and phosphate gives a very much greater yield than the addition of any of these substances alone. It is pointed out also that the standardization of the decoctions on Fuller's scale leaves them differing widely in hydrogen ion concentration. This work brings out the fact that little is really known of the nutrient value of plant decoctions, which it appears are generally deficient in nutrients and require the addition of considerable "fertilizer" to produce the greatest growth of fungi.—H. HASSELBRING.

Maps of rainfall and crop plants.—Among the recent publications of the United States Department of Agriculture there are two at least of decided interest to ecologists and plant geographers. The first is a rainfall map of the United States¹⁷ embodying the data from not less than 3600 stations. The precipitation is given in inches and the map is in 8 shades of blue. An interesting insert map gives the rainfall from April 1 to September 30, and exhibits a

¹⁶ DUGGAR, B. M., SEVERY, J. W., and SCHMITZ, H., Studies in the physiology of fungi. *Ann. Mo. Bot. Gard.* 4:165-173; 279-288. 1917.

¹⁷ KINCER, JOSEPH B., *Atlas of American agriculture*. Advance sheet 1: Precipitation. U.S. Dept. Agric. Weather Bur. 1917.